

SEQUENCE LISTING

Sub
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<110> KIRIN BEER KABUSHIKI KAISHA

<120> Endo- β -N-Acetylglucosaminidase Gene

<130> PH-657-PCT

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<150> JP98/141717

<151> 1998-05-22

<160> 37

<170> PatentIn Ver. 2.0

<210> 1

<211> 2369

<212> DNA

<213> Mucor hiemalis

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Phe Ala Leu Lys Ser Met Asn Glu Leu Arg Asp Trp Thr Pro Asp Glu

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25

30

aag ata aag ttt aac gtt tca agc gtg gca cta cag cct cgt gtg aaa 144

Lys Ile Lys Phe Asn Val Ser Ser Val Ala Leu Gln Pro Arg Val Lys

35

40

45

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Asn Ala Leu Lys Pro Gln Leu Leu Leu Thr His Asp Met Ala Gly Gly

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Tyr Lys Glu Asp Lys Asn Ile Gln Gly Asn Asn Tyr Lys Asp Ile Tyr			
65	70	75	80
aac att caa tat tgg cat tta gct gat act ttt gta tat ttc tct cat			288
Asn Ile Gln Tyr Trp His Leu Ala Asp Thr Phe Val Tyr Phe Ser His			
85	90	95	
gag cga gtt agc att cct cca gtc aat tgg aca aat gct tgt cat aga			336
Glu Arg Val Ser Ile Pro Pro Val Asn Trp Thr Asn Ala Cys His Arg			
100	105	110	
aat ggt gta aag tgt tta ggt act ttt tta gta gaa gga aat aac caa			384
Asn Gly Val Lys Cys Leu Gly Thr Phe Leu Val Glu Gly Asn Asn Gln			
115	120	125	
atg cat gaa atg gaa gcc ttg ctt cac ggt cca cct tta ctt aat aac			432
Met His Glu Met Glu Ala Leu Leu His Gly Pro Pro Leu Leu Asn Asn			
130	135	140	
act gac gac cct atg aga tta tgg agt ccg tat tat gca gac caa tta			480
Thr Asp Asp Pro Met Arg Leu Trp Ser Pro Tyr Tyr Ala Asp Gln Leu			
145	150	155	160
gtt gct att gct aaa cac tat ggt ttt gat ggc tgg ttg ttc aat att			528
Val Ala Ile Ala Lys His Tyr Gly Phe Asp Gly Trp Leu Phe Asn Ile			
165	170	175	
gaa tgc gaa ttc ttt cct ttt cct aca aat cca aaa ttc aaa gct gaa			576
Glu Cys Glu Phe Phe Pro Phe Pro Thr Asn Pro Lys Phe Lys Ala Glu			
180	185	190	
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Glu Leu Ala Lys Phe Leu His Tyr Phe Lys Glu Lys Leu His Asn Glu			
195	200	205	
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Glu	Ile	His	Trp	Gln	Asn	Gln	Leu	Thr	Trp	Lys	Asn	Glu	Leu	Phe	Phe	
225				230					235			240				
aaa	aac	acg	gat	ggt	att	ttt	ttg	aat	tat	tgg	tgg	aaa	aaa	gaa	tac	768
Lys	Asn	Thr	Asp	Gly	Ile	Phe	Leu	Asn	Tyr	Trp	Trp	Lys	Lys	Glu	Tyr	
				245				250			255					
cct	gaa	atg	gcg	cgt	aga	gta	gct	gaa	gga	ata	ggt	aga	tca	ggt	tta	816
Pro	Glu	Met	Ala	Arg	Arg	Val	Ala	Glu	Gly	Ile	Gly	Arg	Ser	Gly	Leu	
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gaa	gtt	tat	ttt	ggt	aca	gat	gta	tgg	gga	agg	cat	act	tat	ggt	ggc	864
Glu	Val	Tyr	Phe	Gly	Thr	Asp	Val	Trp	Gly	Arg	His	Thr	Tyr	Gly	Gly	
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ggt	ggt	ttc	aaa	tca	tat	aag	ggt	gta	aaa	act	gcc	tac	tct	gca	atg	912
Gly	Gly	Phe	Lys	Ser	Tyr	Lys	Gly	Val	Lys	Thr	Ala	Tyr	Ser	Ala	Met	
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Thr	Ser	Ser	Ala	Leu	Phe	Gly	Met	Ala	Trp	Thr	Tyr	Glu	His	Phe	Glu	
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Lys	Ser	Glu	Phe	Glu	Lys	Met	Asp	Arg	Leu	Phe	Trp	Cys	Gly	Gly	Lys	
		325			330			335								
tac	tct	gac	tat	cct	ccc	cca	cct	cct	aaa	aac	cca	gat	gac	gaa	aaa	1056
Tyr	Ser	Asp	Tyr	Pro	Pro	Pro	Pro	Pro	Lys	Asn	Pro	Asp	Asp	Glu	Lys	
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gaa	gta	gaa	agc	gat	gat	agt	gaa	gat	gag	ctc	atg	tac	gga	cac	aag	1104
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Lys Gly Ile Ala Asp Thr Val Glu Ser Ile Pro Val Pro Gly Thr Asp			
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Trp Phe Val Thr Asn Phe Asp Arg Gly Phe Gly Asn Arg Phe Tyr Tyr			
385	390	395	400
aga gga aag aga tta ctt tct cag cct tgg tcc cat tta tcg cat caa			1248
Arg Gly Lys Arg Leu Leu Ser Gln Pro Trp Ser His Leu Ser His Gln			
405	410	415	
gct att ctc ccc aat aaa agc tat cga aat cca gag att tat ccc act			1296
Ala Ile Leu Pro Asn Lys Ser Tyr Arg Asn Pro Glu Ile Tyr Pro Thr			
420	425	430	
gat caa aac att aaa atc act agt tct ctc gat tgc gat cat gga gct			1344
Asp Gln Asn Ile Lys Ile Thr Ser Ser Leu Asp Cys Asp His Gly Ala			
435	440	445	
ttt ctt ggt gga acc tcg ctt att atc aaa ggc caa cgt ttc aat cat			1392
Phe Leu Gly Gly Thr Ser Leu Ile Ile Lys Gly Gln Arg Phe Asn His			
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aga gaa tcg cat gat gtt gaa act gaa att agt ata cct ctg tat aag			1440
Arg Glu Ser His Asp Val Glu Thr Glu Ile Ser Ile Pro Leu Tyr Lys			
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ctt tca tta gat gct agt aaa gga tgc tca ttg cgt tat att tat aga			1488
Leu Ser Leu Asp Ala Ser Lys Gly Cys Ser Leu Arg Tyr Ile Tyr Arg			
485	490	495	
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Thr Leu Leu Met Lys Asp Val Lys Leu Thr Val Ala Cys His Phe Ser			
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Leu Lys Thr Asn Asp Ser Val Asn Phe Phe Lys Val Trp Gln Pro Asp			

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gaa aat ttc tct ttt gaa tat gat gat gga atg aga gcc act gtt aca			1632
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Glu Asp Thr Gly Glu Asn Asp Trp Ile Thr Lys Thr Ile Asn Val Pro			
565	570	575	
gct gtt cca gaa gga agt caa tta tac att aca aga ctt gaa gtg agc			1776
Ala Val Pro Glu Gly Ser Gln Leu Tyr Ile Thr Arg Leu Glu Val Ser			
580	585	590	
gta gta tta gat aca gct ggt tta gta ggt ctt gtt aat caa gtt att			1824
Val Val Leu Asp Thr Ala Gly Leu Val Gly Leu Val Asn Gln Val Ile			
595	600	605	
gct tgc ttg gga tat att agc atc ata cca act ata aat tct gga ata			1872
Ala Cys Leu Gly Tyr Ile Ser Ile Ile Pro Thr Ile Asn Ser Gly Ile			
610	615	620	
aaa aca gat tca tca cgc att att cag gat ctc ttt tgg aaa gat cag			1920
Lys Thr Asp Ser Ser Arg Ile Ile Gln Asp Leu Phe Trp Lys Asp Gln			
625	630	635	640
aaa tat acc aaa atc gga aaa gaa agt tta gac gac ata gct caa gaa			1968
Lys Tyr Thr Lys Ile Gly Lys Glu Ser Leu Asp Asp Ile Ala Gln Glu			
645	650	655	
gaa gtt cat aga tat tat gga aca ttg aac tgg gaa aac aca gca aat			2016
Glu Val His Arg Tyr Tyr Gly Thr Leu Asn Trp Glu Asn Thr Ala Asn			
660	665	670	
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Val Val Asn Ala Trp Glu Glu Ile Asp Tyr Tyr Asn Val Phe Tyr Lys
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 Glu Ser Asp Asp Ser Ala Thr Arg Ile Phe Leu Gly Thr Ala Phe Cys
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 Asn Gln Phe Arg Val Ser Gly Leu Asp Ile Ile Leu Ser Lys Leu Pro
 705 710 715 720
 aag ata gtt att gaa gct gtt aac aaa gaa gga tac atc tct tca agt 2208
 Lys Ile Val Ile Glu Ala Val Asn Lys Glu Gly Tyr Ile Ser Ser Ser
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<212> PRT

<213> Mucor hiemalis

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 35 40 45
 Asn Ala Leu Lys Pro Gln Leu Leu Leu Thr His Asp Met Ala Gly Gly

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Asn Ile Gln Tyr Trp His Leu Ala Asp Thr Phe Val Tyr Phe Ser His		
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Glu Arg Val Ser Ile Pro Pro Val Asn Trp Thr Asn Ala Cys His Arg		
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Met His Glu Met Glu Ala Leu Leu His Gly Pro Pro Leu Leu Asn Asn		
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Val Ala Ile Ala Lys His Tyr Gly Phe Asp Gly Trp Leu Phe Asn Ile		
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Glu Cys Glu Phe Phe Pro Phe Pro Thr Asn Pro Lys Phe Lys Ala Glu		
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Glu Leu Ala Lys Phe Leu His Tyr Phe Lys Glu Lys Leu His Asn Glu		
195	200	205
Ile Pro Gly Ser Gln Leu Ile Trp Tyr Asp Ser Met Thr Asn Glu Gly		
210	215	220
Glu Ile His Trp Gln Asn Gln Leu Thr Trp Lys Asn Glu Leu Phe Phe		
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Glu Val Tyr Phe Gly Thr Asp Val Trp Gly Arg His Thr Tyr Gly Gly		
275	280	285

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Glu Val Glu Ser Asp Asp Ser Glu Asp Glu Leu Met Tyr Gly His Lys
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595	600	605
Ala Cys Leu Gly Tyr Ile Ser Ile Ile Pro Thr Ile Asn Ser Gly Ile		
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Lys Thr Asp Ser Ser Arg Ile Ile Gln Asp Leu Phe Trp Lys Asp Gln		
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Lys Tyr Thr Lys Ile Gly Lys Glu Ser Leu Asp Asp Ile Ala Gln Glu		
645	650	655
Glu Val His Arg Tyr Tyr Gly Thr Leu Asn Trp Glu Asn Thr Ala Asn		
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Val Val Asn Ala Trp Glu Glu Ile Asp Tyr Tyr Asn Val Phe Tyr Lys		
675	680	685
Glu Ser Asp Asp Ser Ala Thr Arg Ile Phe Leu Gly Thr Ala Phe Cys		
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